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THE Chemist

MARCH, 1945 VOLUME XXII, No. 3

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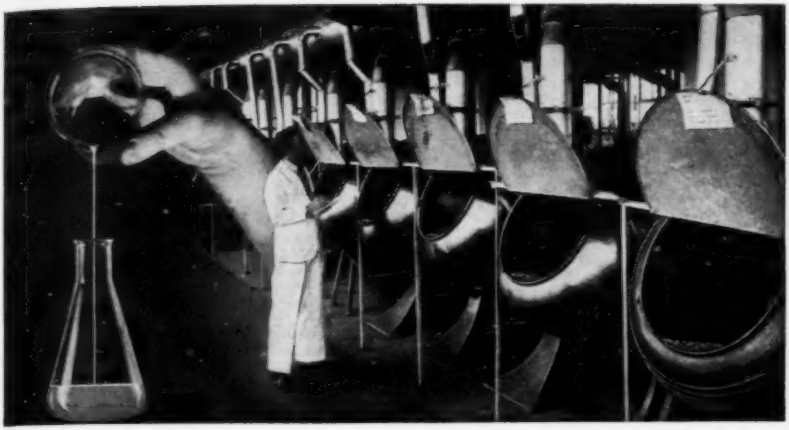

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The Chemist

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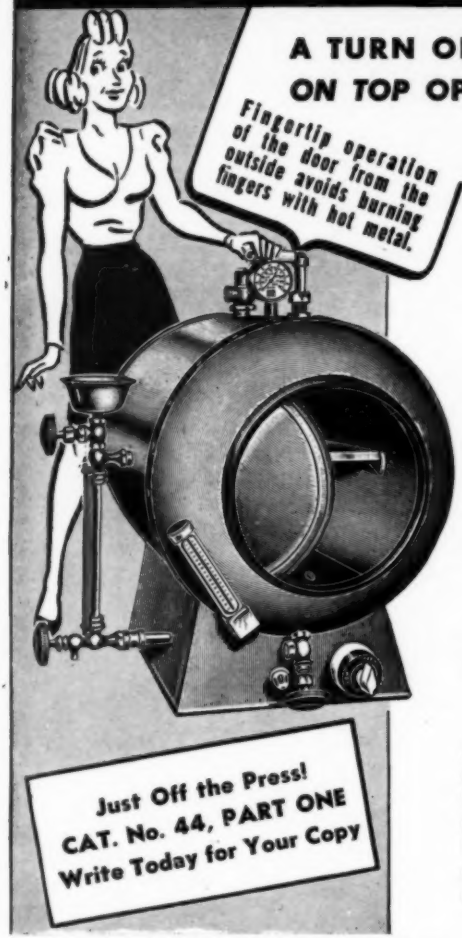
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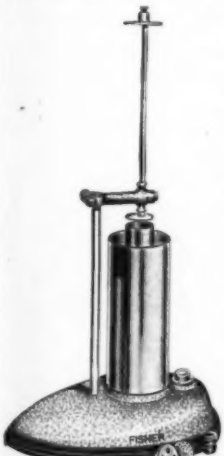

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IADC – New Instrument of Hemisphere Development

J. Rafael Oreamuno

Vice Chairman, Inter-American Development Commission

THE nations of America are turning their attention to the difficult economic problems ahead. Businessmen, manufacturers, foreign traders, and many others are seeking to determine the future trends of Western Hemisphere trade and industry. The future of inter-American economic relations is an integral part of plans now being made to increase postwar business. And one of the most pertinent questions being asked is: Will inter-American economic cooperation, which has been so fruitful in wartime, be extended to peacetime?

Answers to this and many other questions are being found in part in the cooperation and activities of the Inter-American Development Commission and its network of affiliated national Commissions in all of the twenty-one American republics.

The Inter-American Development Commission, established in Washington, and its twenty-one national Commissions form a novel international organization through which business and government have been brought into collaboration on economic and industrial problems. The organization was created by the coordinated efforts of all of the American republics. It is an instrumentality for their joint action in promoting and assisting industrialization through the utilization of natural resources, thereby contributing to the raising of living standards.

The parent Commission and the twenty-one Commissions of Inter-American Development recognize the importance to the national economies of the Americas of a free flow of trade between them. To promote this objective they seek the adoption of more liberal trade policies through the lowering of tariff barriers and the elimination of other practices which obstruct international trade and stifle competition.

Development of hemisphere resources and industry is the keynote of the system of Commissions of Inter-American Development. The Commissions recommend that this development be carried out by private enterprise where possible and that governmental regulation of private enterprise not be exercised beyond the de-

gree necessary to protect the public interest.

While the Inter-American Development Commission is not a financing agency, one of its major aims is to encourage joint investment of United States and Latin American capital in industrial expansion and new enterprises.

Since its organization in June, 1940, the parent Inter-American Development Commission in Washington, in cooperation with its affiliated national Commissions, has served as a clearing house for business information. When requested, it has acted in an advisory capacity to private business and governmental agencies.

Some of the activities of the Commissions include bringing together of interested parties and assisting toward the establishment of a cashew nut oil factory in Brazil, a pencil factory in Argentina, construction of additional milk pasteurization plants in Colombia, and preparation of plans for a chemical salt by-products industry in Colombia and for an aluminum plant in Brazil.

Other projects similarly assisted include: Cost estimates for a plywood plant in Brazil; experiments designed to lead to the construction of a babassu nut oil plant in Brazil; negotiations by Chilean bread producers with United States manufacturers for equipment and materials for enriching the vitamin content of their products; studies of silk and industrial diamond production in Brazil, and others.

The Technical Office of the Inter-American Development Commission cooperates in many projects, prepares technical reports for the national Commissions or their governments, and assists in making arrangements for the sending of technical missions to the other republics.

Through collaboration of the Joint Committee on Inter-American Engineering Cooperation, the Inter-American Developpment Commission consults with outstanding authorities in the various fields of civil, mechanical, chemical, mining and electrical engineering. This Committee was organized for that purpose by five of the leading engineering societies of the United States.

Engineering assistance such as the selection of mining engineers for work in Bolivia, Brazil, and Peru, and of industrial engineers for Mexico and other American republics, to cooperate in planning developments, has been provided by the Inter-American Development Commission on request. For example, an industrial engineer has been sent to work in collaboration with Colombian engineers in the making of a preliminary industrial survey of Colombia. Arrangements for the survey were made through the Colombian Commission of Inter-American Development by the Instituto de Fomento Industrial of Colombia.

To assist Paraguay in making a

technical survey of its leather, vegetable oils and lumber industries, the Inter-American Development Commission has furnished that country with a technical mission. Specialists in these various industries were requested through the Paraguayan Commission of Inter-American Development by the Ministry of Industry and Commerce of Paraguay.

At the request of its national Commission in Ecuador and of the Eucadoran Minister of Finance for assistance in an agricultural improvement and expansion program, the Inter-American Development Commission has sent an agricultural technical mission to Ecuador.

In cooperation with the Brazilian Commission of Inter-American Development, the parent Commission has arranged for a technical mission of six prominent professors and engineers from Brazil to come to the United States to study the organization and methods in leading technical institutions and observe actual working conditions in modern industrial plants.

In furtherance of industrial accident prevention and other safety programs throughout the other Americas, the Commissions of Inter-American Development are actively cooperating with the Inter-American Safety Council. The parent Commission also is collaborating with the American standards Association in promoting the adoption of uniform technical standards throughout the Americas as an aid to industrial development and trade.

As part of a long-range program for the systematic development of handicraft industries in the other Americas, the Inter-American Development Commission has sent a specialist in hand-made textiles to Mexico and an expert in handicrafts to Peru. The objective is the creation of high standard merchandise, by proper styling of native handicraft articles, and the organization of their production to supply domestic markets and for export to the United States. Similar surveys are contemplated in Bolivia, Chile and Guatemala.

A fisheries survey in the Caribbean area was arranged and a technical fisheries mission was sent to make studies of new sources of marine foods, and the development of local fishery industries. During the survey, the mission was assisted by the National Commissions of the eleven countries visited. The result has been a stimulation by nationals in a number of these countries of their own fishery industries.

The Inter-American Development Commission is interested in assisting young men from the other Americas in securing practical training with private United States industrial and business concerns. In furtherance of this program, it is cooperating with the International Training Administration, a non-profit, world-wide organi-

zation which provides services in connection with the selection, transportation, and programs of trainees.

One of the first problems dealt with by the Inter-American Development Commission soon after its organization was the production in Brazil of high-quality tapioca flour to replace that formerly obtained from the Far East. At the request of Brazilian authorities, arrangements were made for technical studies and the preparation of estimates and plans for the construction of plants for its production.

Plans were worked out for the development of the production in various American republics of other articles for export to the United States, to replace goods formerly obtained by the United States from Europe and other countries. Commercial organizations in the United States sent special representatives to explore these possibilities. This resulted in an increased demand in the United States for articles produced in the other American republics.

To assist merchants, importers and exporters throughout the Americas, the Inter-American Development Commission established in New York a Merchandising Advisory Service. The Advisory Service provided data about persons, firms, products and markets in this hemisphere. However, the shortage of shipping and wartime restrictions in trade resulted in a discontinuance of the service.

The permanent longterm development program of the Commissions of Inter-American development was radically altered with the entrance of the United States and other American countries into the war. The parent Commission in Washington immediately took steps to acquaint the other American republics with the experience of the United States in meeting wartime problems, by distribution through the national Commissions of informative publications.

The chief problems created by the war in some of the other American republics were the shortage of foodstuffs, unemployment due to curtailment of certain industries, reduction in custom revenues, price inflation, and an accentuation of inadequate transportation. To help solve some of these problems, the Commission of Inter-American Development provided expert advice and technical data, and assisted in the creation of a number of projects.

One of these projects was a survey of Brazil's tremendous vegetable oil resources by a group of technical specialists provided by the Inter-American development Commission upon request of the Brazilian Ministry of Agriculture. The information developed by the study, which was printed and distributed by the Commission, assisted in stimulation of Brazil's production and of increased imports by the United States of many essential vegetable oils formerly received from the Far East.

The parent Commission in Washington assisted toward the conclusion of an agreement between the Dominican Republic and Haiti regarding the distribution of Haitian fiber, a material of importance to the war industries in the United States, as well as to the national industry of the Dominican Republic.

The Cuban Commission of Inter-American Development submitted a project for expanding the capacity of a chemical plant producing chlorine, muriatic acid and caustic soda. The Chilean Commission prepared projects for expansion of facilities for producing copper plate, erection of a plant to produce copper wire, and for expansion of inustries manufacturing woolens and leather for the purpose of providing military equipment to the American republics.

The over-all productive capacity in Latin America has increased as never before. It has been supplying the United States with many vital materials, such as strategic metals, rubber, petroleum, and foodstuffs. It has been the most important, and in many cases, the only source of supply for a large part of the critical materials necessary to the United States war effort.

Expansion of wartime production throughout the hemisphere is reflected in the export and import figures between the United States and the other Americas. These figures show notable increase despite shortage of shipping and the conversion of United States industry to war. In 1943, imports of the United States from the other American republics were more than $1,310,000,000 compared with $646,000,000 in 1939. In 1943, United States exports to the other Americas were $819,000,000 compared with $543,000,000 in 1939.

This mobilization of hemisphere resources was aided by measures adopted at a number of inter-American meetings called for the purpose of intensifying hemisphere cooperation. The Inter-American Development Commission was formed to assist in carrying out in part some of these measures.

For the purpose of charting a course of future economic cooperation during the transition into the post-war period, the Commission of Inter-American Development held their first Conference in May, 1944. Delegates from the twenty-one American republics, representing finance, industry, agriculture, commerce, and government, expressed their concerted thinking and joint views in the forty-five resolutions which were unanimously adopted.

These resolutions anticipate the many problems of reconversion, of readjustment, and of national and international economics. They cover industrial development, investment, trade and transportation, utilization of natural resources, and many other phases of economic activity through-

out the hemisphere. In effect, they form a basis for a constructive approach to a better economic future in the Western Hemisphere.

The Inter-American Development Commission was created in furtherance of the economic policy adopted by the American Foreign Ministers when they met in Panama in September, 1939, upon the outbreak of the war in Europe, to consider ways and means of meeting the emergency situation. At this consultative meeting the American Foreign Ministers established the Inter-American Financial and Economic Advisory Committee composed of the representatives of the governments of the twenty-one American republics. This Advisory Committee created the Inter-American Development Commission as a permanent international body charged with promoting and aiding expansion of Latin American industries and production.

The Inter-American Development Commission began operations, and its role as a permanent organization in the development of hemisphere resources as a means of raising hemisphere living standards was confirmed and endorsed by the subsequent meetings of the American Foreign Ministers at Havana and Rio de Janeiro.

Functions of the Inter-American Development Commission were indicated by the meetings of American Foreign Ministers and by the Advisory Committee. They include the provisions for technical studies and compilation of basic information relating to the economies of Latin American nations and the establishment of contact between individuals and groups interested in development activities. The exploration and utilization of natural resources, cultivation and marketing of agricultural and forest products, and establishment of industrial plants are referred to as the Commission's field of interest.

One of the first acts of the Inter-American Development Commission was to organize national Commissions in each of the twenty-one American republics in order to provide close contact with business and financial interests throughout the hemisphere. The national Commissions keep in close touch with each other and with the parent Commission in Washington. They consult on problems of mutual interest, and exchange technical data, reports, and other pertinent information. Many of the national Commissions have prepared helpful reports on the natural resources and the economic problems of their countries. All national Commissions maintain close working contacts with governmental agencies and private groups.

The activities and objectives of the Commissions of Inter-American Development demonstrate what can be accomplished through international cooperation on the good-neighbor principle of mutual aid for mutual

benefit. However, it is recognized that many serious difficulties will be confronted in the important work of the future. But when the pattern being established by these cooperative activities is considered with other trends and lessons learned through experience, the future course of trade and industry in this hemisphere is more clearly defined.

Based upon the well-laid foundation of many years of the expanding inter-American program, the trend has been toward closer relations and greater trade among the Americas. This trend reached new heights during the war when the Americas, facing a common enemy, dedicated their energies and resources to a history-making cooperative endeavor.

Through cooperation during the war, there has been the greatest mobilization of resources ever made in this hemisphere. And throughout the Americas there has been a growing realization that, with their unlimited resources, there can be developed and built a better standard of living. The Americas recognize that they can mobilize for peace as for war. The degree of achievement will depend upon the vision, the will, and the determination of the peoples of the entire Western Hemisphere.

The idea that economic interests of the United States conflict with the industrial development of the other American republics has long been discarded by leading business men. Experience has shown that it is a fallacy to contend that the foreign trade of the United States is dependent upon the industrial retardation of other countries. On the contrary, it has been demonstrated that the best customers of the United States are not countries producing raw materials only, but countries which also are highly industrialized.

As the Latin American countries develop their natural resources and industries along the lines of greatest profit for themselves, the standards of living of their people will be raised proportionately. And with this higher standard of living will come an increase in the purchasing power which will provide the Americas with expanding markets for the benefit of all.

The possibilities through inter-American cooperation were aptly summarized by Nelson A. Rockefeller, chairman of the Inter-American Development Commission, when he declared:

"The opportunities for the future are limitless. The development of hemisphere resources and industry, the improvement of transportation, will provide fuller employment, a rising standard of living, increased buying power, expanding markets, greater trade, more travel, new opportunities for increasing millions of people.

"Surely there are problems ahead—grave problems—but most important there are great opportunities."

Accomplishment of Writing Ink Industry During War

Robert S. Casey, F.A.I.C.

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The writing ink industry cooperated with the armed services in promoting letter writing and publicising the V-Mail service, and developed writing inks for V-Mail which give good contrast when photographed. This will probably accelerate the use of such inks for the microfilming of checks and other business records.

Recent years have been characterized by shortages of most materials used by this industry —glass, metal caps, fiberboard and chemicals such as tannic acid, humectants and dyes. This has been accompanied by a several-fold increase in demand for finished product by the armed services and civilian users.

All demands were met by the use of alternate and less critical materials without sacrificing quality of product. In some instances improvements were achieved.

These results were accomplished so promptly not by a chemical miracle nor even by superhuman effort. It should be noted not only by chemists, but by all who are interested in a sound economy that this industry provides a small but striking example of what has been accomplished as a direct result of many years of research by private competitive industry.

Rolland with General Drug Company.

Mary A. Rolland, F.A.I.C., has joined the staff of the aromatics division of the General Drug Company, 125 Barclay Street, New York, N. Y. She was formerly with the Aromatics and Intermediates Branch of the War Production Board, Washington, D. C.

Stevens with J. T. Baker Chemical Company

Joseph R. Stevens has been appointed director of organic research for the J. T. Baker Chemical Company, Phillipsburg, New Jersey. Dr. Stevens will direct a research program aimed at the expansion of the company's activities in the organic chemical field.

The Chemist In Management

E. C. Williams

Director of Research, General Aniline and Film Corporation, New York, N. Y.

Presented Before
THE AMERICAN INSTITUTE OF CHEMISTS
in New York on January 26, 1945

THE problems of marrying science with industry have been my enthusiasm, as they have been my profession, for more than twenty-five years.

These years roughly cover the period of phenomenal growth of the chemical industry in America and in England during which the purposeful organization of science for the service of industry has become a mainspring of national progress and security.

The essential condition for success can be summed up in one sentence. Find the right leaders and the mechanism of organization or management becomes secondary; fail to find them and no organization or authority will bring more than routine successes.

The functions of scientific workers in industry are so numerous and extensive—and costly—that orderly direction of their activities is a matter of considerable importance. Their work is so specialized, and in many respects, not least in the spirit of its performance, so unique, that it can only be effectively directed by one of their own kind. Yet it must be directed so that the objectives of management are attained; hence the growing entry of chemists into the circle of management proper.

The entry of scientists on a major scale into industry has been of such comparatively recent origin that the full impact of their contribution to management has not yet been felt, in some cases hardly felt at all beyond the conduct of purely technical departments. Yet their trained scientific, analytical approach to their problems can bring wider benefits to the industries which they serve.

I suppose the average age of the true scientific workers in industry, amongst which we should not include those who have merely graduated with technical degrees as part of a general educational background, is little more than thirty to thirty-five. There is therefore still a comparative dearth of men possessing the maturity of judgment and experience necessary to guide the enterprises which are based

on the forces which they are themselves creating.

The effective application of these forces is only secured when they are geared to other parts of the industrial whole particularly to Production, Manufacturing, and Sales. It is to the securing of such unity of objective and effort that the chemist in management must be particularly alert. It is not enough to create and inspire the efforts of scientific workers as an exclusive body because their efforts are valueless until they are integrated with and contribute to all aspects of corporate activities.

The success of this integration depends to the largest extent upon the understanding and vision of the top executive of the organization, its president, but it depends equally on the understanding and ability of scientific leadership to build bridges between the scientific, operating, and commercial divisions of the organization; bridges which must not only be strong and filled with traffic, but easy and pleasant to pass over. There should be no "Keep Out" signs around technical departments, nor jealous guarding of territory.

Failure to carry out this first simple principle has caused more difficulty to the smooth course of technical progress than perhaps any other cause. It may be due to something inherent in the mentality and philosophy of the scientist, perhaps something of intellectual snobbery. Yet this is in no way inherent in his science, and, if it exists, it is more likely to be a failing of the worker himself.

Perhaps long association in college with immutuable laws of nature, and his struggles to discover and apply them, have made him careless of human weaknesses and illogicalities. He has not found it of any consequences, in the work he is in, to humor intractable reactions or to expect compromise from a mathematical equation. He has been trained to determine facts, to arrive at conclusions based on facts, to establish theories and to recheck by rigorous experiment and observation the validity of his theories. Only then does he allow himself to generalize.

All these processes are amenable to strict reason. Upon successful completion they stand for him as demonstrable truth which can only be challenged by equally rigorous analysis accompanied by open disclosure of the contrary facts for scrutiny.

Knowledge of Human Nature Important

Because there is no need for the exercise of human qualities in such work one sometimes finds a lack of appreciation of the importance of human qualities.

The scientist is, therefore, to some extent working in regions above the level of personal frailties or self-interest. He is lost in an atmosphere of generalities or conclusions unsupported by facts. More especially is he repelled by any deliberately biased or

partisan presentation of facts to support a case. He is not accustomed to having to carry people along with him. It is not so with the lawyer, the salesman, the business executive, the politician, or the mere self-seeker whose prime interest is his own well-being. Yet before the work of the scientist can be made effective in industry, he has to reckon, or someone has to reckon for him, with the existence at least of such influences.

No one wishes the scientist to compromise in his rigorous consideration of the laws of nature or behavior of matter. But he must realize, as he enters wider fields of cooperation and management, that many factors are involved which are not amenable to natural laws or experimental proof. In these regions personal opinions and reactions, which are contributory to judgment, may carry the day, and in cases of dispute sometimes carry it in the face of facts. Powers of exposition and persuasion become more potent than mere knowledge, and if error wins in face of truth, it is usually because truth has had the weaker exponent.

Argument is a stimulus to progress and action, and within reason should be encouraged. But let us remember that the whole point of argument is to persuade the other fellow to accept your point of view (you being equally open to accept his), not primarily to prove that you are right. Great harm in the long run is done by proving too often that you are right; if you get your views accepted without the other fellow being shown to be wrong, you have succeeded in the best possible way. Don't bother too much about who gets the credit.

The scientist has as much right to his opinions and personal reactions as anyone else; even more right when he has proven facts behind him. But he must be careful to distinguish between what he states as a fact and what he wishes accepted as his opinion. His colleagues have the right to know in which category his statements lie, and to know whether they are being asked to act on established fact or on faith in someone's opinion or judgment. A good working principle to govern any presentation of scientific or technical work should contain not only the evidence upon which its conclusions are based, but have that evidence so fully and fairly set out that the reader can, if he so wishes, arrive at and defend any alternative conclusion that the facts will bear. To make this more easy, the art should be cultivated of expressing scientific accomplishments and evidence in language so clear that it is understandable by the intelligent layman. This principle is, from a purely selfish point of view also, a protective one because with opinion so separated from the facts on which it is based, it is easy, when a new fact appears, to change one's opinion with no loss of confidence.

The fruitful zones of difficulty and therefore of opportunity in management lie in those regions where fact, opinion, authority, and responsibility meet. Good judgment, the first step towards good management, will recognize these zones automatically and force none beyond its limitations. Good management will see that although, within the complex pattern of modern industry the work of the scientist impinges in countless directions, the responsibilities for its various functions are clearly defined and assigned.

There can be no set pattern applicable to all organizations and when you find a "happy ship"; you will usually also find that the assignment of responsibilities has been governed as much by the qualities and capabilities of the men available and by the past history and growth of the organization as by any theoretic ideal of what men ought to be. The fact that a system works well in one organization is very little criterion that it will work well in another. You may get hints on things you have overlooked and ideas as to how to solve your own problems of organization, but to adopt them wholesale is a sign of lack of imagination and realism. The secret of good administration is to find the best men you can, study their strengths and weaknesses, and frame your organization to make the fullest use of them as a team.

Division of Responsibility

There are some industries, which have been substantially created by an individual or small partnership, where the control of technical affairs, manufacturing, and sales remain in the hands of one man. If he is competent and imaginative, that is an ideal situation from the point of view of speedy action and quick response between various divisions of the company's activities. But such utopias do not usually last long. If the enterprise is successful, it usually becomes too big for such unified control, and there is always the danger that the head of it may become tired or autocratic.

The first breakdown of responsibility is usually the division of Sales and other commercial activities from Production, whereupon the first deliberate planning of liaison begins. Where it is not planned, confusion, perhaps friction, usually sets in around the same time, and the scientific staff, which has hostages in both camps, begins to feel it as soon as any. Under such division, the scientific control of production, the improvement of production techniques, the maintenance of product quality, and research into new activities, in all of which the chemist is particularly active, fall naturally as departments of production. If the production executive is, as is likely to be the case, also the executive in charge of research, the whole technical forces of the enterprise are likely to be well

directed to common objectives, and the transition of work from research to pilot development to manfacturing will cause no particular problems.

With further growth, and more rapidly in the more technical industries which depend for their survival upon the creation of new products or activities, the next decentralization usually takes shape in an independent research and development department. Since this automatically tends to segregate the free thinkers and revolutionaries of the industry, it calls for planning of close liaison and the exercise of a positive spirit of cooperation. Such a separate research and development department can, in the last analysis, only be advisory in nature; alone it can accomplish nothing. The more therefore its cooperation with other departments can be based upon intimate personal relationships and recognition of worth, the happier will the company be. It will be more able to withstand the conflicts of opinion which are healthy and natural in a growing industry, or better still be able to transmute them into dynamic forces.

For this reason it is good that, on the one hand, the research laboratories should have some work on their program which is of close and immediate interest to the factory, while the factory laboratories should be encouraged to do some work of a definite research nature in their own longer term interest. Adoption of this principle alone can do much to produce that compatibility of minds between research and manufacturing men which is so much to be desired. It establishes a common ground where men wish to meet for the very good reason that each can benefit from the other. It is rather elementary, but often forgotten, that the best way to win the wholehearted cooperation of another is to want to help him do his job, without at the same time wanting the credit for doing it. Beware and be suspicious of anyone who, in a cooperative enterprise, wants it to appear that all good is of his doing; even when right he is a bad influence and will do harm in the long run.

Of course there is a danger in such deliberate overlapping of endeavor; not so much in the duplication of work which to some degree is good, but from ultra-competitive individuals or minor groups desiring to prove that they are smarter than the other fellow and keeping back that which might help the whole for the sake of the credit it may bring the part. Some scientific workers seem a little prone to that, and good management should educate them out of it while they are young. No one who shows it is fit to be an executive, even in a minor capacity; indeed, he is almost more pernicious in a minor capacity because he can mislead and distort the judgment of his chief to whom he perpetually runs with his criticisms or self-interested claims.

Finally, in some of the largest organizations, particularly in those which operate in widely diverse fields, we find further decentralization amounting to separately organized divisions, each with independent managements and separate departments for Research, Sales, Manufacturing, and so forth, subject only to direction on matters of higher corporate policy by the home office. This ultimate in decentralization is often the result of putting together by merger already operating concerns, but sometimes arises from the sheer difficulty of organizing an unwieldy whole, especially when the parts are geographically dispersed or active in radically different fields.

In the case of such extreme decentralization particularly, it has been found beneficial to establish a central research organization to carry out investigations either so fundamental or so in advance of the immediate interests of any one division that they are best conducted under authority of over-all management.

It is obvious that under such a variety of conditions no set pattern for the conduct of scientific work can exist and that each industry must frame that organization which suits its circumstances best.

Planning and Control

While with increasing decentralization the need for orderly planning becomes greater, the difference between "planning" and "control" becomes more evident. The two are often confused.

In a one man or small partnership organization the chief, being experienced in all phases of operation, can effectively both plan and control. He can keep abreast of all material facts and act promptly with good judgment in accordance with them. In short, he can control because he knows precisely what is happening and reacts quickly to the full significance of the facts.

But the same circumstances which make decentralization necessary tend to make it impossible for the single head to be currently conversant with all facts or to be able to exercise informed judgment on many matters requiring quick decisions. Thus, while he can plan, he cannot control—at least not efficiently. To attempt to do so is a common and venial fault often found in technical men in positions of management. The very fact of their being personally skilled at the bench is sometimes their greatest stumbling block. They try to arrive at conclusions as they have been wont to do, but forget that they are no longer in a position to know all the facts or observe all the phenomena on which conclusions and decisions should be based. For this reason vital research progress is usually found to spring upwards from the laboratory bench or plant rather than downwards from the directorate.

The best laid plans for scientific

effort are continually upset by happenings quite outside the prevision of the planners and much of the information available for planning can only come from the skill in experiment or observation of the man at the bench. Provided the man at the bench is also imaginative, he clearly is in the best position to recognize how the plan needs to be changed in accordance with the facts. In any case, management must be largely guided by what he reports.

Good planning, under such conditions, consists in such coordination of effort that each responsible person is fully informed of the factors which can help him to recognize what facts and observations are important and arrive at correct decisions on matters for which he is responsible. Responsibility, in this case, necessarily implies a full understanding of the relation which his decisions are likely to have on the decisions of others and therefore on the harmony of the whole. A prime necessity for the efficient conduct of decentralized work is therefore an automatic and quick medium for the exchange of relevant information between the different units of the whole.

The most important work of the chemist in management is in the conduct of research with all that includes in the way of fundamental research, divergent and convergent investigations, process development, chemical engineering, evaluation of new manufacturing techniques, application of products to industrial or consumer needs, etc. We shall not consider here so much the art of research leadership and the organization of research laboratories (which is another story) but matters which integrate research as a function of management.

Research as a Function of Management

The most important consideration, apart from the right choice of men, to which I would direct your attention, is the method of choice of major objectives for research. These may lie in one or other of the following categories, and any single objective may involve problems in many of those categories:

1. The improvement of existing products, or manufacturing techniques—beyond what is the proper function of manufacturing.

2. The development of new products within existing lines of company business.

3. The development of products in entirely new fields—diversification of the company's business.

4. Chemical engineering research to develop new techniques and types of equipment for use in the company's operations.

5. Development of processes from the laboratory through pilot plants to the stage at which they are demonstrated as ready for acceptance by production. That is to the point at which production has reliable data on

which to make its own cost calculations and engineering designs.

6. Coordinating research with customer requirements to ensure that proposed new products are appropriate to the purposes for which they are intended.

7. Exploratory investigations to scout the technical possibility of new ideas whether market inspired, research inspired, or production inspired.

8. Fundamental research for the winning of basic knowledge relative to the company's interests—the foundation upon which all the above items ultimately depend.

Specific objectives still remain to be chosen. Objectives are not in themselves problems, neither does the statement of an objective define the problem to be solved. However, the problems soon begin to make themselves evident after an objective is decided upon. They usually cover a still wider territory than the eight categories already mentioned; for example, market and economic surveys, engineering studies, probable trend of competitive or customer industries, the relation of probable plant requirements to existing plant facilities, the availability of raw materials or by-products from existing operation, the harmonizing of the proposed objective with the current interests and experience of the company, and the likelihood that research will be able to accomplish the technical tasks necessary to achieve the objective.

The majority of objectives in practice arise from some recognizable need of the company. It may be from the failure of its products to meet specific requirements; or from high costs of production which may, in turn, be due to imperfect or obsolete processes, or engineering techniques for conducting them. It may arise from the demands of outside customers for new types of product or from one's own initiative in introducing new products of potential value to industry.

Whatever the urge may be, whether from within or from without, we have to select the most promising lines to work along and determine the relative effort to be expended on each. These are the goals we would like to reach, and may at the outset be quite specific or entirely nebulous. But their choice is a fundamental decision of management because, once made, it consumes the organization's power to do research and launches forces which cannot be quickly recalled. It may be months or years, before it is known whether they will be successful or not. And it is destructive to morale to change horses too often.

The Need for an Analytical Group

From a management point of view we need, therefore, an analytical group to reduce suggestions, or pipe

dreams, or hopes, or even more or less specific demands, to concrete terms in such form that management may express its judgment and preferences—at least tentatively. It is too much to expect that enough information will normally be available at this stage to make final decisions.

This preliminary survey must represent the combined intelligence of marketing, manufacturing, engineering and research. Rather special qualities are required in the men who make it. While it is not necessary that they have skill in the actual conduct of research, production, or marketing, they must be able to dissect and expose the elements of the matter. They need not attempt to solve, or even suggest solutions for, the problems which they expose. It is not necessary that they even have the ability to solve them. But that does not matter because we have other groups to do that; just as other groups may discover new reactions or techniques without having the slightest conception of how to apply them to useful ends.

Similarly, we may use economists to analyze trends of costs, markets and prices who may be unable to go out and sell anything successfully; or conversely, men who seem to be able to sell anything in spite of its having no demonstrable value.

At this stage we make use of analytical and critical rather than constructive, creative, or managerial talents. The matters that come up for analysis may originate from anywhere within or without the organization. They range all the way from complaints about the performance of the products to dreams of entirely new industrial materials or concepts for their use.

They may be Research inspired, Production inspired, Sales inspired, or Customer inspired. The discovery of a new reaction, or a new product, or a new technique through basic research in the laboratories may throw light upon hitherto intractable problems and catalyze all the above sources of inspiration. So may the vision of some sales representative catalyze the whole forces of research.

Arising from this joint effort of critical analysis there comes what I call an "Appreciation of the Situation" for the guidance of management. Such an appreciation contains a statement of the facts so far as they are known, and attempts to appraise their bearing upon the interests of the company. It indicates the weak points in the chain and tries to identify what must be accomplished before the objective can be attained. It further evaluates, as far as possible, the potential scope of success and rewards to be won. It should indicate the differences of opinion or conclusions which the facts warrant. If it can, though this is hardly likely yet, it should attempt to forecast the

probable time and cost of reaching the objective

In short, this "appreciation", by disclosing the main issues, both known and unknown, invites and makes possible a management decision by presenting the facts upon which decisions can be made. It makes possible a rough, very rough, estimate of the nature and scope of the tasks involved.

We might call this the "diagnostic" stage of research because it corresponds somewhat to the work of the diagnostician as a precursor to the operative surgeon.

In the preparation of this analytical survey calls are of course made, wherever desirable, on the appropriate departments of the company qualified to give advice and information. Requests may also be made, where circumstances justify, for limited exploratory experimental work.

The Decisions of Management

Briefed by such "appreciations", management now has something to work upon. Management, in this context, means the chief executive, that is the president of the company, with his economics expert in council with the heads of Production, Research, and Sales.

To separate these three prime controls when considering such matters of communal interest is the most fruitful cause of divided counsel and delay, calculated to bring even the best and most cooperative of men into misunderstanding, dispute, or even friction. It would indeed be utopia if executives in charge of such major divisions were, from their properly different viewpoints, to see eye-to-eye on even a majority of problems, much less when the conflicting claims of an indeterminable future are at issue. Obviously all should have, and have in unison, so that they can freely debate amongst themselves (written reports and memoranda, though good preparation, are not enough) full knowledge of the company's progress, difficulties, problems and plans, whether of a Research, Manufacturing, Sales or economic nature. No one can contribute his best unless he knows the whole picture to which he is contributing. He can neither be efficient in the performance of his special tasks nor constructive in planning the work of his department as a contribution to the whole.

Let me mention here one particular principle, based on so much experience of its value that I believe it to be universally true. That is, whenever you wish to understand and solve to the satisfaction of all a difficult problem on which there are radical and honest differences of opinion, never, if possible, listen to the arguments for one view without having the proponent of the other present. It is not fair to either to hear them separately, because by doing so you take away from each the chance to hear and consider the arguments of

the other. You thus do an unconscious injustice to both sides, and above all, to your own chance of forming a correct judgment.

Incidentally, to follow this principle is one of the surest ways to foster a real team spirit within an organization and to avoid or neutralize clashes of personality or ambition. Of course I am referring here to the business leadership of a cooperative team, not to political maneuvering where it is, I am told, advantageous to keep different groups in the dark as to your own plans and conversations.

On the evidence before it, it is not now difficult for management, under the leadership of the president, to arrive at a rational decision, at least on what to do next. The various objectives open are weighed for their relative importance and their relative chance of accomplishment, having particularly in view the magnitude of the goal to be won, and the cost at which it is likely to be attained.

Assuming an objective to be chosen, it is then broken down, according to its circumstances, into suitable partial objectives for allocation to the appropriate executive departments, specifically in most cases, Research, Production or Sales. Particular aspects will naturally go to the patent, legal, or other appropriate staff departments.

From that point on it is up to each department to plan its campaign for tackling its own part of the program, break it down into whatever projects are necessary, and allocate them to the men or groups most qualified to conduct them.

It will take us too far afield tonight to follow the course of research and development projects through their various vicissitudes. As soon as you get to grips with the problem, it often proves to be something quite different in detail, and sometimes in nature, from what had been supposed. Frequently we fail altogether, but it is surprising how often the mere conduct of the work leads us into new and entirely unexpected discoveries which form the basis for new suggestions and new objectives. It was the head of the General Electric laboratories, I think, who said: "In fact, unless the experimental failures outnumber the successes, one may usually conclude that little real research work is being carried on."

Establish An Objective

But no organization can move unless it has a clear idea of its objective. We have seen what can be done by organization to steer research into fields which are logically arrived at and represent the best judgment of management. But if the objectives are amenable to definite analysis and planning in this way, it is almost axiomatic that they will be as open to the analysis of others and can, therefore, hardly be expected to result in radically new advances.

We must not overlook, therefore, provision for spontaneous generation

of ideas. We recognize that most of the really outstanding advances in industry have arisen from the enthusiastic initiative and perseverance in the face of difficulties of individual research workers.

A major task of management is accordingly, first, to encourage and provide environment for initiative; second, to recognize sufficiently early the merit and impact of original conceptions, provide the correlative studies, and back them with all the support that organization can give. This is one of the greatest opportunites for, and the greatest tests of, enlightened management. It is easy to advance irrefutable (not necessarily correct) arguments during the early stages why a novel conception should not work; it takes higher intelligence to see that it might work, and an exceptional one to make it work. Obstacles are overcome and things are created by those who see opportunities in their difficulties rather than difficulties in their opportunities.

I think of progress in industry taking place by two mechanisms; a wave motion, and a spasmodic or "jump" motion. Progress by wave motion consists in pushing forward the front which the art has already reached by carefully planned attacks at points in the line which offer good promise of yielding results. One probes and learns more about what one is doing, experiments with variations that might lead to improvement, employs new techniques or instruments to perfect and cheapen methods of manufacture, build better qualities into the products, and so forth.

This type of thing is going on all the time in every progressive industry and is well amenable to organization and management. It requires research and technical ability of a high order because presumably existing standards are already high and require much skill to raise them.

"Jump" motion, on the other hand, is to a large degree the result of unexpected or novel advances. It comes from a different mental approach. Not "how can we improve our method of doing so and so" but "why do we do it that way at all; surely there must be some better way of reaching that objective." That is a good spirit to foster.

It is almost impossible to plan such approaches; they represent the revolutionary attitude of discontent. We want some revolutionaries. They stir up things around them; they cause trouble sometimes with colleagues, but they act as mental stimulants, too. They do not like being organized; they try to shake your confidence in what you have staked your effort and money on. All right, let that be a part of your plan; it is good to have a few revolutionaries around. Don't try to organize them, but do let them know what you are trying to do so they can have something to shoot at.

It is a good plan, when there is no

good revolutionary and everyone seems agreed and satisfied or perhaps complacent, to ask someone to constitute himself a revolutionary, to act as devil's advocate and in council deliberately attack the conclusions that have been arrived at. This has often proved a helpful way to check one's conclusions and expose one's fallacies.

So much for the relations of the scientific worker in relation to overall management. I would now like to consider some aspects of the cooperation between Research and Development and other divisions of the company.

The Relations of Research and Development to Production and Sales

It is easy to appreciate that with the development of any project through the various stages of fundamental research, process development, and pilot plant trials on the one hand, to commercial production, industrial application, customer acceptance and sales on the other, there are many opportunities for confusion, divided interest, and duplication of effort arising from uncertainty as to who is responsible at any particular moment for "carrying the ball." "Solving the jigsaw puzzle" would be a better simile. Actually, different parts of the jigsaw may have to be solved by different people at the same time, because if you cannot solve one part, it may be useless to finish the others.

The test of good management lies, therefore, in having a clear conception of the talents, responsibilities, and interests of others and ensuring that once major policies have been settled, work is properly distributed and carried through to its objectives.

The emphasis on the work itself, as well as on who performs it, may require frequent revision and distribution according to the course that it is taking. In this respect the method of working of the creative chemist, or similar scientific worker, in the chemical industry, differs in a basic and fundamental way from that of the engineers; I do not refer here to the purely inventive type whose invention has also to perform functions which are outside the realm of engineering proper.

Ask an engineer to design a machine to perform a certain mechanical function, or build a bridge to carry specific traffic, and he will be able to plan and forecast almost exactly what is going to happen at all stages up to the completion of the job. And he knows that his creation will work. Every bolt and joint and shape and surface will be as he planned it to be. It will perform the function he planned it to perform.

He knows where the component parts of the job will be at any given time: weeks, months or even years ahead, whether in the drafting room, in the foundry, in the steel mill, or in the machine shop, on the job site. or in the course of erection.

The parts will flow together at appointed times and places, and they will fit. They won't move sideways or backwards, or hesitate, or blow up.

The engineer does not expect to find at a late stage that something has come out wrong so that the whole job has to go back to the drafting room or to his own office so that he may reconsider what to do about it, or drop the project altogether.

Yet that is exactly what does happen in the normal course of any major new enterprise in the chemical industry. It is often neither wave motion or "jump" motion, but Brownian movement.

To an engineer it must look rather like a basketball game does to a layman. He might wonder why, when the objective is to put the ball in the basket, people throw it around and bounce it in such apparently unproductive directions. Yet basketball is far easier to understand than the movement of a chemical industrial development. You can at least see your adversaries in basketball and maneuver to elude them. In the chemical game you usually don't know your adversary is there until you hit him.

The course of any worthwhile achievement in chemical industry is a succession of collisions with unexpected adversaries, extrication from which may mean calling at short notice for some partner, who has the particular skill, or experience, or talent to overcome the difficulty that has balked you.

The organization to handle such a situation must clearly be flexible and fast working, expecting the unexpected, and ready to regroup its forces or change weight as circumstances demand. In such organization we should particularly guard against the danger of drawing hard and fast lines (which the project itself can hardly be expected to observe.)

The Three Executive Departments

The prime requisite is to have as few as possible independent executive controls responsible to management. There is then less chance of clash over questions of divided interests or responsibilities which, with the best will in the world, cause delays and confusion.

Three such controls are normally necessary and sufficient; Research and Development, Manufacturing, and Sales. These three can, subject to the guidance of management, expeditiously execute the policies of management.

The mere mechanics of management, as well as the executive conduct of the work itself, increase in geometric proportion as this number is increased with little or no corresponding advantage and usually with the disadvantage of the delay inherent in reconciling or compromising independent counsels. Too often what is done under such circumstances repre-

sents only the lowest common denominator rather than an aggressive policy. A large group is of value as a forum for the ventilation of opinion but not as an executive body.

The above number should therefore be increased only for very special reasons; for example, in large and dispersed companies, and then only when executives with long experience of working together are available.

Naturally, each of the above executive departments has as many specialized groups responsible to them as are necessary to carry out the varied functions involved.

We can diagramatically develop a functional triangle to show how these various functions and controls are related to each other; not statically, but growing toward and into each other. (Probably a sphere would be a better geometric shape, best of all a spinning one!)

The apexes of the triangle represent the three controls. The functions of any one control are shown along the sides leading from its apex.

Functions concerned entirely with one control and therefore substantially its concern alone, are shown nearest to its apex. Thus, routine manufacturing, regular sales, or fundamental scientific research fall in this category.

Moving away from any apex are written the other functions of the control in order of increasing interest to that control towards which they are moving. There is, of course, no absolute significance about the functions detailed in the attached diagram; they should be modified to suit the circumstances of any organization, but the principle involved is clear.

At, or about, the middle of each side of the triangle we logically and inevitably arrive at those functions which are of such interest to two controls that they cannot effectively be conducted without the active cooperation of both; and it is only for reasons of good administration that they must be placed under one or the other. For example, in the zone between Research and Sales there is a very fluid condition expressed on the diagram by "exploratory contacts, seeking potential uses for our products, and opportunities for new" and "technical cooperation with customers' technicians."

The first represents effort to find outlets for new products whose functions and properties are rather well established and whose acceptance depends chiefly on skillful and informed presentation to the customer. This is best carried out by technical men in the Sales department. It is their duty to open up new fields of uses based on known properties. They usually fall back on the research staff only when some unexpected or special problem arises.

The second of the above two functions deals rather with new products, which are by no means yet proved to

be valuable for the customer's need; products, for example, which still need modification in properties to meet the user's requirements. Frequently much adaptation and demonstration is required to persuade the customer that the product is of any use to him at all. Sometimes the manufacturer has to carry out extensive investigations in his own laboratory on the problems of the customer. Sometimes the customer will need to modify his existing products or methods of manufacture to gain the benefits of the new product. There are all sorts of ramifications of this type, and in practice the problems are best solved, or are only solvable, by close cooperation between the research laboratories of the potential buyer and would-be seller. There is no immediate question of sales at this stage because until such work has been done, there is no evidence that the product is worth buying.

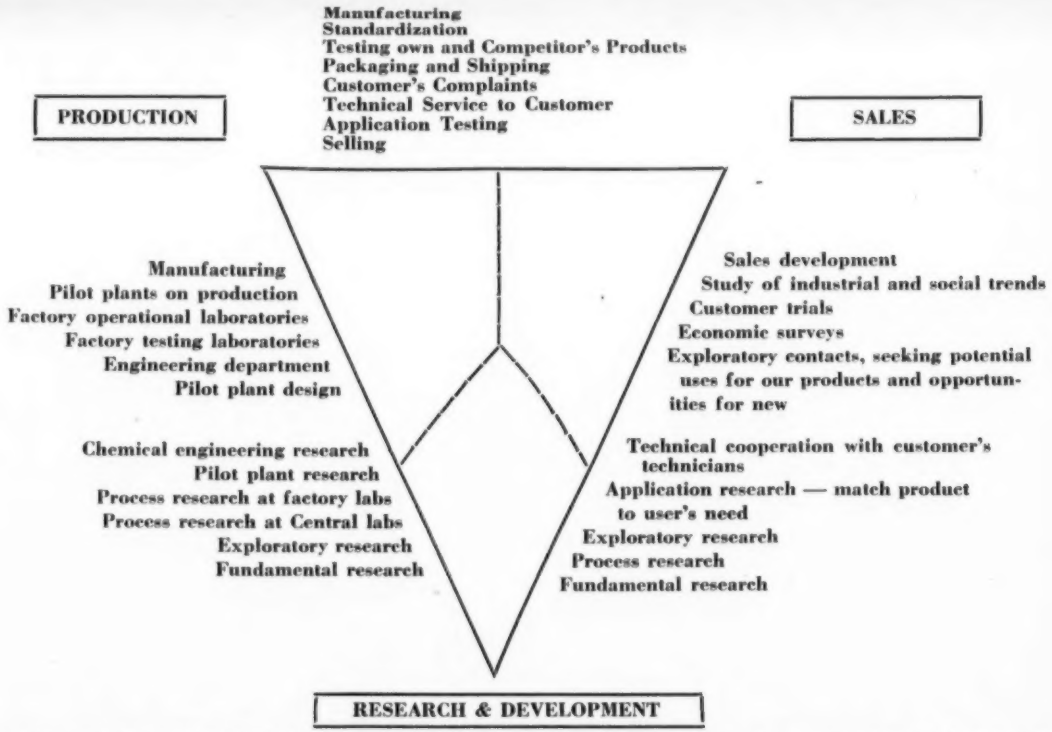
These two particular functions are an example to show how nearly they can approach each other, yet how different they are in mental attack and in the special skills required to perform them. The men for the first function, though technically trained, clearly operate best under Sales administration; the men for the second are research men out of the research laboratories, therefore, under Research administration.

Actually, of course, every problem of this nature is likely to pass back and forth between the two types; one finds the openings; the other solves the problems involved. Frequently they are on the job together.

The same sort of blending of functions, leading at the right moment to the transfer of administrative responsibility, occurs along the other two sides of the triangle; i. e. between Production and Sales, and between Production and Research. The zone of "pilot plant design" and "chemical engineering research" is another good example.

It is just in these regions, where we would like groups to act as single individuals, that we are dependent upon two administrative controls acting with such perfect understanding that the ball may be thrown back and forth between them according to the circumstances of a project at any particular moment. It is largely a question of good timing and good consideration for each other's interests and responsibilities. If these do not exist, no organization can draw satisfactory lines on a basis of mere authority.

These are the regions where personal ambitions and enthusiasms may, and so often do, cause friction and confusion. Naturally, such impediments occur more readily among the younger staff, close to the bench or plant, who are so enthusiastic in their work that they are jealous for its success. Sometimes, with less reason, they



Inter-relation of Executive Controls and some Typical Functions. Dotted lines show approximate administrative boundaries. There is latitude for judgment, according to circumstances, as to where the latter are drawn; but they must be drawn somewhere to prevent confusions arising from a potential "No Man's" or "Everyman's" land.

are jealous also for their part in the success.

It is the duty and one of the great opportunities of technical management to see that these zones of cooperation are efficient and harmonious.

Just as company management steered the technical forces, particularly the research activities of the company, towards its broad objectives so, as the plan is executed, the same mechanisms in reverse keep management informed and educated on the progress and significance of the work.

In this way all is kept within the broad policies of management, and decisions can be made either to support more strongly, or modify, or where necessary abandon, any part of the plan.

In the scientific industries good management will not abandon well considered objectives merely because the going is hard or immediate successes disappointing. The more serious condition is when, with the best skill and imagination available, no rational avenue of advance can be seen. In such cases, it is best to terminate, or at least shelve the project. But before deciding finally on termination, an up-to-date "appreciation of the situation" should be prepared and as carefully considered as that which launched the project on its way.

There still remains, from a management point of view, the decision as to when, in the course of major projects, the actual executive control should pass from one division of the company to another. Such transitions almost indicate themselves and should take place so smoothly that decisions of management will be comparatively easy, except in those cases where the difficulties of the project preponderate.

Find the right leaders, and the mechanism of organization and management become secondary; fail to find them, and no organization can bring more than routine successes.

Schur with Ecusta Paper Corporation

Milton O. Schur, F.A.I.C., formerly with Brown Company, Berlin, N. H., is now with Ecusta Paper Corporation, Pisgah Forest, North Carolina.

Hamlin with American Home Products

Marston L. Hamlin, F.A.I.C., formerly with the Barrett Division of Allied Chemical and Dye Corporation, New York, has joined the staff of the Patent and Trademark Department of American Home Products Corporation, 350 Fifth Avenue, New York, N. Y.

Robert J. Quinn, of the Mathieson Alkali Works, was recently elected president of the Compressed Gas Manufacturers' Association, Inc.

Firestone Research Laboratory Completed

THE completion of the new research laboratory of the Firestone Tire and Rubber Company at Akron, Ohio, was announced on March first by John W. Thomas, chairman of the company.

This $2,000,000 laboratory, designed for the development of improved tires and other rubber and plastic products, will bring immediate acceleration of research into improved synthetic rubber for military tires, electronic vulcanization of rubber, lighter flak vests for airmen, and other wartime projects.

Plastic dresses and suits, tires in which synthetic rubbers of various types are "tailored" to fit the needs of civilian motorists, rubber and plastic films to permit air transport of fresh tropical fruits to American dinner tables, and luxurious rubber mattresses and cushions are typical of the postwar projects which will undergo further development in the new laboratory.

Textile and metal research, as well as rubber and plastic projects, will be conducted in the new laboratory. distilled water from taps, steam, vacuum action, compressed air, a wide variety of AC and DC electrical currents are a few of the service units installed in each research room.

Completely air-conditioned, the laboratory has pre-fabricated steel inner walls and partitions, which can be moved to rearrange the interior of the building.

Constant temperature and humidity control has been arranged for an infra-red room, an electric measurements room, and a physical testing room. There is a large library, and an outdoor aging laboratory.

An electronic microscope which magnifies 20,000 times, x-ray diffraction apparatus, a quartz spectrograph, and many pieces of equipment designed by Firestone engineers especially for the new laboratory, are available to the research staff.

The laboratory was built under the personal supervision of Mr. Thomas, who is one of the first major industrial executives to recognize research as a vital arm of successful business.

The official opening of the new laboratory is scheduled for May 12, 1945.

Mr. Thomas was recently awarded the gold medal of THE AMERICAN INSTITUTE OF CHEMISTS for 1945, in recognition of his contributions to rubber research and for achievements under his direction in the development and production of synthetic rubber. Presentation of the medal will take place at the Miami Chapter meeting on May 11th in Columbus, Ohio.

Industry Sees Shortage of Trained Scientists

A. E. Marshall,
President,
Rumford Chemical Works,
Rumford, R. I.

THE war has markedly accelerated scientific developments, in many fields. Some of these developments, particularly those based on chemistry and chemical engineering, reveal even wider horizons and greater fields ahead. To cultivate them successfully is going to call for increased numbers of well trained technicians.

But since 1942 we have had so few students studying the sciences on which the chemical industry depends that it will be at least five years, possibly more, before enough young graduates will be available. To continue to hold our place in a competitive peacetime world will be the biggest problem confronting the chemical industry. Other nations, despite much greater difficulties, have managed to maintain part of their science training programs.

Foster Dee Snell recently spoke before the Association of Medical Directors, New York, on "How the Consulting Chemist Serves Business."

Bogart and Reid Elected Honorary Members

Dr. Marston Taylor Bogert, F.A.I.C., professor emeritus of organic chemistry, Columbia University, New York, N. Y. and Dr. E. Emmet Reid, F.A.I.C., professor emeritus of chemistry, The Johns Hopkins University, Baltimore, Maryland, have been elected to Honorary Membership in THE AMERICAN INSTITUTE OF CHEMISTS. The formal presentation of the scroll of Honorary Membership will take place at a time and place to be announced later.

Price with Oakite Products

Donald Price, F.A.I.C., formerly with the Interchemical Corporation and National Oil Products Company, author of many technical papers on organic and physical chemistry and well known for his research work on sulfonated oils, wetting agents, synthetic detergents, textile finishes and water-repellants, has been appointed technical director of Oakite Products, Inc., New York.

Dr. Price will direct the activities of Oakite's chemical and engineering staff and Research Laboratory in connection with the company plans to expand its technical service facilities to the various branches of the textile industry it serves.

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February Meeting

THE 218th meeting of the National Council of The American Institute of Chemists was held on Wednesday, February 28, 1945, at the Building Trades Employer's Association Club Rooms, No. 2 Park Avenue, at 6:30 p.m., President Gustav Egloff presiding.

The following officers and councilors were present: Messrs. G. Egloff, F. A. Hessel, R. E. Kirk, H. B. McClure, J. M. McIlvain, R. J. Moore, H. S. Neiman, M. Siegel, F. D. Snell, A. L. Taylor and M. Toch.

Dr. E. L. Luaces, Dr. J. F. Muller, Mr. T. S. McCarthy, Mr. C. E. Monoghan and Miss V. F. Kimball were present.

The minutes of the preceding meet-

ing were approved.

The treasurer's report was read and accepted.

The secretary reported that the membership of the Institute now totals 1923 members.

Upon motion made and seconded, Arthur Schroder was employed to hold the position of manager or such other designation as may be decided upon, and Dr. Egloff, as president, was given authority to act accordingly.

The secretary read letters from Drs. Marston T. Bogert and E. Emmet Reid which expressed their pleasure at having been awarded honorary memberships in THE AMERICAN INSTITUTE OF CHEMISTS.

Upon motion made and seconded, a letter from Mr. H. F. Lichtenberg, suggesting that the INSTITUTE'S code of ethics be printed in a form suitable for framing, was referred to the committee on ethics for its recommendation.

The subject of the new roster of THE AMERICAN INSTITUTE OF CHEMISTS was discussed and upon motion made and seconded, it was decided to have the new roster retain the size and shape of the preceding one. It was also decided to include short biographies of each member, and to have a questionnaire prepared which would cover the desired information. The division of the membership into industrial fields, at the end of the roster, was also discussed favorably. Upon motion made and seconded, it was decided to turn over the production of the roster to Mr. Schroder.

Dr. E. L. Luaces reported that plans and the program of the Annual Meeting to be held May 11 and 12 were progressing satisfactorily, and that the Miami Valley Chapter is making excellent progress in the arrangements for the Annual Meeting.

Dr. Egloff reported that he had discussed the subject of licensing of chemists with Mr. H. A. Wagner of the American Society of Engineers, who will give him further information about the possibility of securing the licensure of chemists in Illinois.

Discussion took place regarding the formation of additional chapters in those sections of the country where a number of INSTITUTE members are concentrated.

Dr. Egloff suggested that the INSTITUTE office take over the work of mimeographing and mailing in connection with the professional activities which had formerly been done in his office.

It was suggested that a committee be formed to correlate the work of the eleven chapters of the INSTITUTE.

It was also suggested that a "lecture bureau" be formed from which the chapters may be able to select speakers. This matter was referred to Mr. Schroder.

Dr. Egloff reported that one thousand copies of the papers of Dr. Carlson, Dr. Fox, and Dr. Eisen-

schiml, on the subject of "What Shall We Do With Germany?" which appeared in THE CHEMIST had been reprinted, with the addition of a foreword, and that 531 copies had been sent to our congressmen and senators.

Mr. McCarthy and Mr. Monoghan discussed the subject of advertising in THE CHEMIST. THE CHEMIST was requested to notify its advertisers and potential advertisers of the quality of its circulation.

The editor of THE CHEMIST was requested to have the May issue of THE CHEMIST published on April 25th, so that copies could be sent to Columbus by May 1st. It was also requested that this issue contain the Annual Reports for the year.

Upon motion made and seconded the following new members were elected:

Fellows

Bjorksten, Johan A.
(1945), *Industrial Research Chemist,* Bjorksten Laboratories, 185 No. Wabash Avenue, Chicago 1, Illinois.

Callison, Elizabeth C.
(1945), *Physiologist, P-4 grade,* U. S. D. A., Bureau of Human Nutrition and Home Economics, Beltsville Research Center, Betsville, Maryland.

Farber, Eduard
(1945), *President,* Polyxor Chemical Company, New Haven, Connecticut, *Chief Chemist, Timber Engineering* Company, Washington, D. C.

Freyer, Egbert
(1945), *Chemist, In Charge Technical Control,* Spencer Kellogg and Sons, Inc., 389 Ganson Street, Buffalo 3, New York.

Geddis, Clarence R.
(1945), *Vice President and Chemist,* The Morrison Printing Ink Company, 1011 Power Avenue, Cleveland 14, Ohio.

Hampel, Clifford A.
(1945), *Research Chemist,* Minnesota Mining and Mfg. Co., St. Paul 6, Minn.

Hewston, Elizabeth M.
(1945), *Chemist, P-4 grade,* U. S. D. A., Bureau of Human Nutrition and Home Economics, Beltsville Research Center, Beltsville, Maryland.

Hoyt, Lester F.
(1945), *Research Chemist,* National Aniline Division, Allied Chemical and Dye Corporation, 1051 S. Park Avenue, Buffalo, New York.

Kithil, Richard
(1945), *Assistant to Manager,* Fine Chemicals Division, Carbide and Carbon Chemicals Corporation, 30 East 42nd Street, New York 17, N. Y.

Ralston, William
(1945), *Chief Chemist,* Tobacco By Products and Chemical Corporation, Box 726, Richmond, Virginia.

Reeves, Richard F.
(1945), *Research Chemist,* Calco Chemical Division, American Cyanamid Company, Bound Brook, N. J.

Sobell, Otto H.
(1945), *Technical Director and Chief Chemist,* The J. R. Watkins Company, 150 Liberty Street, Winona, Minnesota.

Willien, Leon J.
(1945), Institute of Gas Technology, 3300 Federal Street, Chicago 16, Illinois.

Members

Butler, Lillian I.
(M.1945), *Chemist,* U. S. D. A., Bureau of Human Nutrition and Home Economics, Beltsville Research Center, Beltsville, Maryland.

Foltz, Thomas R., Jr.
(M.1945), *Research Chemist,* Philadelphia Quartz Company, 121 South Third Street, Philadelphia 6, Pennsylvania.

Levy, Doris
(M.1945), *Assistant Chemist,* U. S. D. A., Bureau of Human Nutrition and Home Economics, Beltsville Research Center, Beltsville, Maryland.

Meltzer, Julius
(M.1945), *Chemical Engineer,* War Department, Army Service Forces, New York Chemical Warfare Procurement District, 292 Madison Ave., New York 17, N. Y.

Moehling, D. E.
(M.1945), *Patent Agent,* Universal Oil Products Company, 310 South Michigan Avenue, Chicago 4, Illinois.

Nissley, William J.
(M.1945), *Chemist,* Tobacco By Products and Chemical Corporation, Box 726, Richmond, Virginia.

Vail, John H.
(M.1945), *Chemical Engineer,* Anaconda Wire and Cable Company, 1133 West Western Avenue, Muskegon, Michigan.

Wittcoff, Harold
(M.1945), *Organic Research Chemist,* General Mils, Inc., 2010 East Hennepin Avenue, Minneapolis 13, Minnesota.

Associates

Carey, Mary M. R.
(A.1945), *Chemist,* U. S. D. A., Bureau of Human Nutrition and Home Economics, Beltsville Research Center, Beltsville, Maryland.

Diering, Helen F.
(A.1945), *Junior Chemist,* U. S. D. A., Beltsville Research Center, Beltsville, Maryland.

Eaton, Anthony
(A.1945) *Chief Control Chemist,* Standard Pharmacal, 847 W. Jackson Blvd., Chicago 7, Illinois.

Frascati, Richard A.
(A.1945) *Chemical Engineer,* (U. S. Synthetic Rubber Laboratories, 351 West Wilbeth Road, Akron, Ohio.

Frenchman, Ruth
(A.1945) *Chemist,* U. S. D. A., Bureau of Human Nutrition and Home Economics, Beltsville Research Center, Beltsville, Maryland.

Greenwood, Jane B.
(A.1945) *Junior Chemist,* U. S. D. A., Bureau of Human Nutrition and Home Economics, Beltsville Research Center, Beltsville, Maryland.

Latimer, Mary B.
(A.1945) *Chemist, P*-1, U. S. D. A., Bureau of Human Nutrition and Home Economics, Beltsville Research Center, Beltsville, Maryland.

Schaevitz, Jeanette
Chemist, U. S. D. A., Bureau of Human Nutrition and Home Economics, Beltsville Research Center, Beltsville, Md.

Upon motion made and seconded, Frederic Sievenpiper was raised from Associate to Fellowship membership.

There being no further business adjournment was taken.

Foster Dee Snell, F.A.I.C., president of Foster D. Snell, Inc., Brooklyn, N. Y., recently spoke before the Wabash Valley, Kalamazoo, Midland, Michigan State College, Toledo, and Detroit sections of the American Chemical Society, the Miami Valley Chapter (Dayton) of THE AMERICAN INSTITUTE OF CHEMISTS, and the Will County Chemical Society (Joliet) on "The Factors in Detergency". He also addressed the Indianapolis section of the American Chemical Society on "What the Consulting Chemist Does".

CHAPTERS

Baltimore

Chairman, Albin H. Warth *Vice-chairman,* Walter H. Hartung

Secretary-treasurer, Edward M. Hanzely
3816 Kimble Road
Baltimore 18, Maryland

Council Representative, Maurice Siegel
News Reporter to THE CHEMIST, Ralph Lamenzo

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Chairman, Hilton I. Jones *Vice-chairman,* Robert J. Gnaedinger

Secretary-treasurer, Charles L. Thomas
Universal Oil Products Company
Riverside, Illinois

Council Representative, Gene Abson

Los Angeles

Chairman, Albert Salathe *Vice Chairman,* Henry W. Greenhood

Secretary, Major J. B. Ficklen
L. A. C. Health Department
808 N. Spring Street, Los Angeles, Calif.

Treasurer, E. B. Henderson
Council Representative, R. J. Abernethy
News Reporter to THE CHEMIST, J. B. Ficklen

A MEETING of the Chapter was held in the Midway Room of Clifton's Cafeteria on January 8th, with Dr. A. Salathe, Chairman, presiding. Fourteen members attended. Minutes for the September and November meetings were read and approved. The Treasurer's report was approved as read. The Chairman asked Mr. C. G. Munger, Program Chairman, for the program of the next meeting. Mr. Munger asked that a definite list of objectives of the Chapter be adopted first so that the program could better fit these objectives. On the motion of Dr. Elizabeth B. Glazer, the following items were carried as objectives that the

Chapter should actively foster:

(1) The licensing of chemists in California.

(2) A roster of chemists in the Los Angeles area.

(3) Act as a clearing house for chemists to employers in this area.

The Chairman then appointed the Licensing Committee as follows: Mr. Paul C. Rich, Chairman, and Messrs. Edwin B. Henderson and Charles W. Henning.

Mr. H. W. Greenhood, in charge of the roster, brought out certain troubles with adequately handling this matter. Several suggestions were made by members, but the matter was held over for further discussion. On motion by Mr. Greenhood, the Los Angeles Chapter adopted $10.00 per year as local Chapter dues for each Chapter member whether fellow member or associate of the INSTITUTE. The Chairman then appointed Messrs. Greenhood and Henning as a committee to report on the cost of hiring a part-time paid secretary for the Chapter.

Mr. Henning was requested by the Chair to bring in a draft of By-laws suitable for the Chapter.

Mr. R. J. Abernethy, Council representative, accented the importance of getting our objectives immediately before the members and also called attention to the fact that the Professional Coordinating Council in this area wishes information as to whether the Institute was suitable for membership in this council. Major Joseph B. Ficklen, III, was authorized to contact the Secretary of this Council. Mr. Edwin B. Henderson called attention to a "Freedom in Science" movement initiated in England to combat efforts such as are being sponsored in this country under the Kilgore Bill. He stated that individual scientists in England were carrying on this effort rather than industry as in this country. More information as to membership, which is free in this organization, can be obtained by contacting Mr. Henderson direct at 442 San Pasqual, Los Angeles 42.

Louisiana

Chairman, D. F. J. Lynch *Vice-chairman*, C. S. Williamson, Jr.
Secretary-treasurer, J. David Reid
Southern Regional Research Laboratory
2100 Robert E. Lee Boulevard
New Orleans 19, Louisiana
Council Representative, Harold A. Levey
News Reporter to THE CHEMIST, Helen M. Robinson

Miami Valley

Chairman, E. L. Luaces *Vice-chairman,* J. M. Purdy
Secretary-treasurer, John R. Fisher, Jr.
Chemical Developments Corporation
1771 Springfield Street, Dayton 3, Ohio
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Allied Chemical and Dye Corp.
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Alternate, Alvin F. Shepard
Reporter to THE CHEMIST, John E. Seubert

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Secretary-treasurer, M. Paul Hofmann
C. O. Bartlett-Snow Company
6200 Harvard Avenue, Cleveland, Ohio
Council Representative, Charles W. Rippie

Pennsylvania

Chairman, Glenn E. Ullyot
Vice-chairman, Harold A. Heiligman
Secretary-treasurer, Kenneth E. Shull
23 Bala Avenue, Bala Cynwyd, Pennsylvania
Council Representative, John M. McIlvain

A MEETING of the Chapter was held on Tuesday, January 30th, at the Engineer's Club. An informal dinner preceded the regular business meeting.

The speaker of the evening was Dr. M. L. Crossley, research director, American Cyanamid Company. Dr. Crossley discussed "Professional Status and Licensure," A brief account of his talk follows:

In order fully to understand professional status it is necessary to differentiate between the type of service rendered by the professional man and by skilled labor. Both use knowledge; however, professional service differs in that it involves ability to think with facts, to understand their significance and assemble them into a thoroughly evaluated program for acquiring further knowledge needed in the solution of problems. Study for the professional man never stops.

The chemist is by nature a retiring sort of individual, and is not prone to broadcast his accomplishments to the world. The result is that society in general is not conscious of the profession of chemistry.

There are many instances in which speeches have been made by great men on technological advances, wherein financial and business men have been lauded at the expense of scientists. We speak often of the contributions chemistry has made to civilization, but rarely of what chemists have done.

There are two ways by which professional solidarity may be achieved: The first is by unionization. Such action, however, is not suitable for a scientific profession. Collective bargaining, employing the weapon of the strike to secure results, is not conducive to the establishment and maintenance of the atmosphere of freedom necessary for the full development of scientific thought and activity. The relationship between the chemist and his employer must be such as to insure at all times mutual confidence and esteem. Collective bargaining, if adopted by the chemical profession, must secure fair compensation for chemists without impairing their position or sacrificing their freedom of action. Scientific ideas will not develop if the profession is to be subjected to regimentation and force.

The other course of action—a dignified INSTITUTE policy based on

sound equitable principles—appears to be much the wiser. If the profession of chemistry is established on such a high plane as to secure public confidence and respect it will be a much more potent force on the problems at hand than would unionization.

The influence of the INSTITUTE in representing the chemical profession can be no greater than the union of purpose it possesses. However great the freedom of action allowed to its members, the INSTITUTE must have a common unified policy and must possess the power to enforce it. The first essential is to have an organization capable of putting into effect the decisions made with regard to policy. This organization must be headed by a man of such commanding personality and distinction as to obtain readily a hearing with both the educator and the employer of chemists. The policy with respect to the economic problems of the profession should be definite, fair and equitable. It should provide for a scale of starting salaries for all who are qualified and endorsed by the INSTITUTE as members of the profession, and, likewise, provide the basis for a satisfactory plan of annual increases based upon the quality of the service rendered. Whether or not a chemist qualifies for professional standing may be ascertained by examination and/or by recommendation of responsible persons who are thoroughly familiar with his knowledge and abilities.

The proposed INSTITUTE plan should be based on the economic principle that the salary paid to the professional man does not represent the entire compensation his services demand but is instead only the carrying charges of his investment. It must recognize that this service must be amortized and the cost of the amortization provided for in factors of cost of goods and service to be paid for by the consumer in the price of goods and service.

It need hardly be added that a very lively and interesting discussion followed Dr. Crossley's presentation.

Washington

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Secretary-treasurer, Royal E. Rostenbach

319 North Quincy Street, Apt. 1

Arlington, Virginia

Council Representative, Walter J. Murphy

Reporter to THE CHEMIST, T. H. Tremearne

Western Pennsylvania

President, Henry G. Goodman, Jr. *Vice-president,* Henry F. Smyth, Jr.
Secretary-Treasurer, Jacqueline S. Front
Mellon Institute of Industrial Research
Pittsburgh 13, Penna.
Council Representative, William H. Hill

For Your Library

COMMERCIAL METHODS OF ANALYSIS. By Foster Dee Snell and Frank M. Biffen. *The McGraw-Hill Book Company,* 753 pp. 8¼" x 5". $6.00.

A volume of commercial methods of analysis is obviously intended as a reference guide for a testing and analytical laboratory. To meet these requirements, it must contain such a diversity of material that most demands on it for information will find an answer. On the other hand, the entire volume of commercial methods of analysis, which includes the routine checking of almost every conceivable material, is so great that some considerable selection must be exercised to prevent the book from becoming unwieldly.

The large practice of the authors guarantees that their selection will contain those methods, which they had found most frequent to be called for. This choice may, in fact almost certainly will not, coincide with that of another analyst, but that is no criticism of the book.

The first four chapters of the book, comprising eighty pages, are of such a general nature that they might possibly be considered as adapted for the use of students rather than of practical analysts. However, the presentation of the questions of technique discussed is good and has the sanction of precedent. Chapter Five on qualitative analysis by micro and spot tests is entirely new in books of this sort and should prove very useful. The remaining chapters cover a wide variety of commercial materials, from minerals and alloys through soaps and waxes to synthetic resins.

The reviewer has been unable in reading the book to find any noteworthy error. As a whole, the book appears to be carefully and lucidly written and is particularly to be commended for the frequent guides to interpretation of the analytical data secured. It deserves a place on the shelf of every practical industrial analyst and should not be allowed to remain on the shelf, but see constant use.

—KARL M. HERSTEIN, F.A.I.C.

The Office of the Alien Property Custodian, Field Building, Chicago 3, Illinois, announces the publication of two sets of abstracts of the 45,000 alien-owned patents seized by the Alien Property Custodian.

The set of "Mechanical and Electrical Abstracts" (about 37,000 patents) is bound in four volumes with index. The set of "Chemical Abstracts" (about 8000 patents) is in 33 sections with index. Each set of abstracts sells for $25.00 An index showing section or class titles and individual section prices may be obtained without charge from the Office of the Alien Property Custodian.

Battelle Memorial Institute, Columbus, Ohio, has just published "Research in Action," a fifty-eight page illustrated booklet, describing the work of that Institute. A copy is available to readers of THE CHEMIST on request.

Gerald Wendt, F.A.I.C., science director of *Time, Life, and Fortune,* is giving a series of eight lectures for the John L. Elliott Institute, New York. His course, "Science Challenges Society," is given Friday evenings, through March 30th.

Dr. L. H. James has established a consulting laboratory service in industrial microbiology at 189 West Madison Street, Chicago 2, Illinois.

Gustav Egloff, President, A.I.C., presented the Charter at the formal opening of the Northern Ohio Chapter of THE AMERICAN INSTITUTE OF CHEMISTS, Cleveland, on February fourteenth, and spoke on "Petroleum as a Chemical Industry." On the twenty-sixth, he spoke at the Washington Chapter of the INSTITUTE, Washington, D.C., on "Petroleum in a World at War."

On the twenty-seventh, Dr. Egloff spoke before the Pennsylvania Chapter of the INSTITUTE at Philadelphia on "The Chemist's Role in a World at War" and on the twenty-eighth, to the Advertising Club of Baltimore, on "New Things for More People."

Lidfeldt-Sherman

Viola Lidfeldt, F.A.I.C. and Joseph V. Sherman were married on November 18th in Florence, South Carolina, and are now living at 134 Prospect Place, Brooklyn, N. Y. Mr. Sherman is associated with Herbert R. Simonds, Consulting Engineer, New York, N. Y.

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Recently a Fellow of the INSTITUTE was told the following story by the father of a Freshman who had just enrolled in the Engineering Department of a western seat of learning.

On the first day of the class, the instructor appeared dressed neatly in a business suit; the second day he appeared in slacks and a jersey and made the following statement: "Yesterday I wore my suit just to show you that I had one, but from now on you won't see me in anything like that again."

It would seem to this observer that those interested in improving the status of various technically trained men such as engineers, chemists, physicists, etc. could be of substantial help to see that such incidents as above never happen again. There is no question in my mind that slovenliness and poor dress in the classroom is an indirect contributor to certain characteristics being developed in later life, which at least do not contribute to the bettering of the economic status of the student involved.

—JOSEPH B. FICKLEN, III, F.A.I.C.

The Association of Consulting Chemists and Chemical Engineers, Inc. announces the publication of its 1945 *Classified Directory*. A copy may be obtained on request to the association at 50 East 41st Street, New York 17, N. Y.

Release Chemists from the Military Services

Otto Eisenschiml F.A.I.C., speaking before sections of the American Chemical Society in Wisconsin, Illinois, Minnesota, and Tennessee, stressed the importance of releasing chemists from the army now to keep America leading in industrial development.

Dr. Eisenschiml pointed out that "thousands of chemists have been drafted into our military forces, but these men have had a thorough scientific training and represent an investment of immeasurable value to the country.

"Yet, these men were not kept in their positions. Why should this be so? During the first World War no chemist was allowed to fight. Have we forgotten our lesson so quickly? Other countries are keeping their inventive genuises at home. Why don't we?

"The total number of chemists now serving in the Army is merely a drop in the bucket compared to the total of enlisted men. They should be released at once, whether or not they were in essential war work at the time they were drafted, for upon them rests a great deal of our ability to meet competitive conditions in the future and to keep America at the head of the industrial procession."

Griffith Awarded Medal

Ivor Griffith, F.A.I.C., president of the Philadelphia College of Pharmacy and Science, was awarded the newly-founded William Procter, Jr., Medal of the Philadelphia Drug Exchange January 23 on the occasion of the eighty-fourth annual dinner of the exchange.

The medal was awarded Dr. Griffith in recognition of his long and distinguished services in the pharmaceutical field as scientist, educator, administrator, and adviser.

Miron with Amino Products

Simon Miron, F.A.I.C., formerly with Lion Oil Refining Company, El Dorado, Arkansas, is now on the research staff of International Minerals and Chemical Corporation, Amino Products Division, Rossford, Ohio.

Mary Renoll, F.A.I.C. formerly at the Central Research Laboratory of Monsanto Chemical Company, is now engaged in research at Ohio State University.

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—A.A.A.S. BULLETIN

Meeting Dates

Mar. 15. Business Meeting. Los Angeles Chapter, THE AMERICAN INSTITUTE OF CHEMISTS.

Mar. 15. Meeting. Baltimore Chapter. THE AMERICAN INSTITUTE OF CHEMISTS.

Mar. 21. Meeting. Washington, D. C. Chapter, THE AMERICAN INSTITUTE OF CHEMISTS. Wardman Park Hotel.

Mar. 23. New York Chapter of THE AMERICAN INSTITUTE OF CHEMISTS, 26th Floor. No. 2 Park Avenue, New York, N. Y. Speakers: Dr. Elmore H. Northey, Pharmaceutical Division, Calco Chemical Division of American Cyanamid Company, "The Therapeutic Implications of the Sulfa Drugs"; Dr. Walter Modell, Cornell University Medical College, "Recent Developments in Antibiotics."

Mar. 27. Pennsylvania Chapter. THE AMERICAN INSTITUTE OF CHEMISTS. Engineers' Club. Philadelphia. Speaker: Dr. Foster D. Snell, President, Foster D. Snell, Inc. "The Factors in Detergency."

April 13. Chicago Chapter, THE AMERICAN INSTITUTE OF CHEMISTS. Huylers Restaurant, 310 So. Michigan Ave., Chicago. Speakers: Dr. E. C. Williams, vice president and director of research, General Aniline and Film Company.

Apr. 18. Meeting. Washintgon, D. C. Chapter. THE AMERICAN INSTITUTE OF CHEMISTS. Wardman Park Hotel.

April. 18.. Joint Meeting. Pennsylvania Chapter. THE AMERICAN INSTITUTE OF CHEMISTS, and Philadelphia Section, The American Chemical Society, Engineers' Club, Philadelphia. Speakers: Dr. H. G. Byers, F.A.I.C., "Soil Genesis and Some Soil Properties."

Apr. 19. Meeting. Baltimore Chapter. THE AMERICAN INSTITUTE OF CHEMISTS.

Apr. 19. General Meeting. Los Angeles Chapter, THE AMERICAN INSTITUTE OF CHEMISTS.

Apr. 27. New York Chapter of THE AMERICAN INSTITUTE OF CHEMISTS. Student Medal Presentation, 26th Floor, No. 2 Park Avenue, New York, N. Y. Speaker: Professor Alexander O. Gettler, Toxicologist of the City of New York, "Contributions Chemistry has Made in the Detection of Crime."

May 11-13. Miami Valley Chapter. THE AMERICAN INSTITUTE OF CHEMISTS. Deshler-Wallick Hotel, Columbus, Ohio. Medal Award to John W. Thomas, chairman and directing head, The Firestone Tire and Rubber Company. Program to be announced. Dr. E. L. Luaces, chairman of Committee on Arrangements.

May 17. Business Meeting. Los Angeles Chapter, THE AMERICAN INSTITUTE OF CHEMISTS.

May 17. Dinner and Business Meeting. Baltimore Chapter. THE AMERICAN INSTITUTE OF CHEMISTS. Northway Apartments, Baltimore, 6:30 p. m.

May 21-23. Sixth Annual Conference of the Institute of Food Technologists. Hotel Seneca, Rochester, N. Y.

May 25. New York Chapter of THE AMERICAN INSTITUTE OF CHEMISTS. Annual Business Meeting. 26th Floor, No. 2 Park Avenue, New York, N. Y. Speaker: Dr. Wanda K. Farr, Celanese Corporation of America, "Utilization of Plant Cell Membranes."

June 1. Chicago Chapter, THE AMERICAN INSTITUTE OF CHEMISTS. Business Meeting.

June 21. General Meeting. Los Angeles Chapter, THE AMERICAN INSTITUTE OF CHEMISTS.

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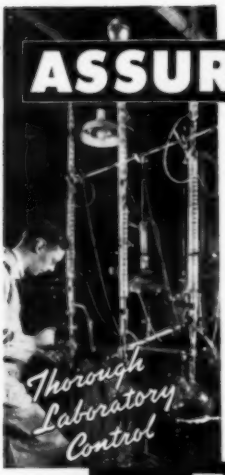

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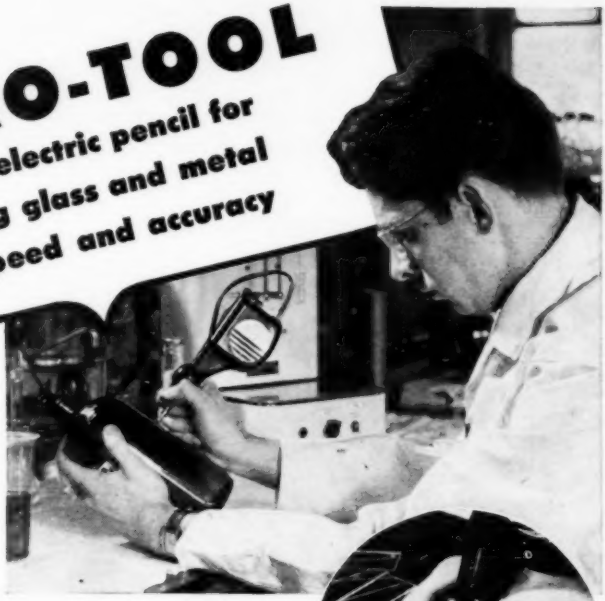

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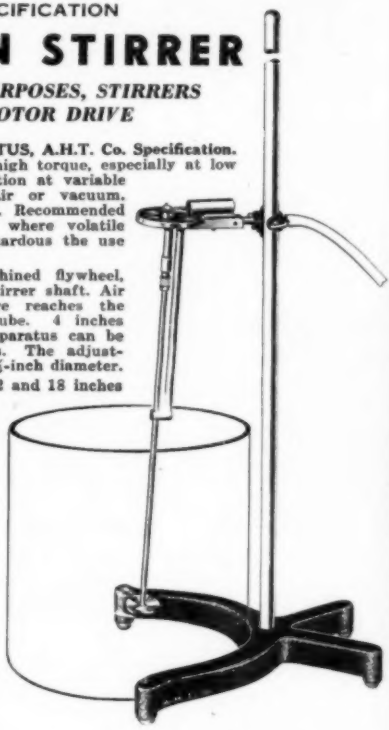

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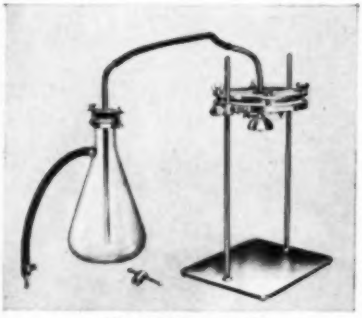

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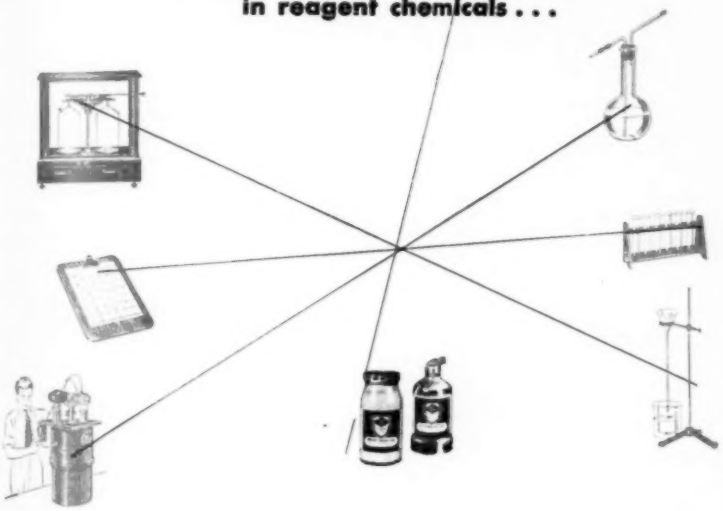

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